

E 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180
N 45

SUPER TYPHOON PAGE

BEST TRACK TC-29W
05 NOV- 01 DEC 90
MAX SFC WIND 140KT
MINIMUM SLP 898MB

40

35

30

25

20

15

10

5

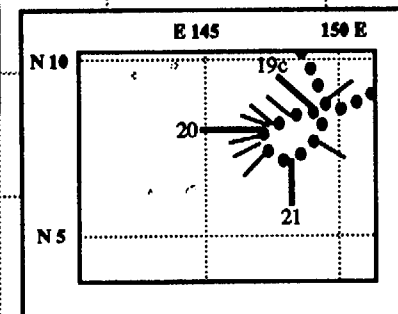
EQ

L - 30/12Z

DTG	SPEED	INTENSITY
19/00Z	--	30
19/06Z	10	30
19/12Z	7	25
19/18Z	1	25
20/00Z	3	30
20/06Z	2	30
20/12Z	4	30
20/18Z	5	30
21/00Z	10	25
21/06Z	10	25
21/12Z	11	25
21/18Z	14	25

LEGEND

- 6-HOUR BEST TRACK POSIT
- a SPEED OF MOVEMENT (KT)
- b INTENSITY (KT)
- c POSITION AT XX/0000Z
- TROPICAL DISTURBANCE
- TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◆ SUPER TYPHOON END
- ◆ EXTRATROPICAL
- ◆ SUBTROPICAL
- *** DISSIPATING STAGE
- F FIRST WARNING ISSUED
- L LAST WARNING ISSUED



F - 19/00Z

1st TCFA

2nd TCFA

ABPW

SUPER TYPHOON PAGE (29W)

I. HIGHLIGHTS

Page was the third of four tropical cyclones to form in November, the second super typhoon of the month, and part of the three-storm outbreak which included a pair of tropical cyclones near the date line: Owen (30W) in the northern hemisphere and Sina (TC 03P) in the southern hemisphere. Persisting as a discrete disturbance for nearly two weeks before the first warning was issued, Page took only three days to intensify to 140 kt (70 m/sec) once development commenced.

II. CHRONOLOGY OF EVENTS

- 050600Z - First mentioned on the Significant Tropical Weather Advisory as an area of persistent convection with an estimated minimum sea-level pressure of 1008 mb.
- 170300Z - First Tropical Cyclone Formation Alert based on better convective organization with increased low-level inflow, indications in the NOGAPS prognostic series of a decrease in vertical wind shear over the area, and a CI 1.5 estimate.
- 180300Z - Second Tropical Cyclone Formation Alert based on a broadening low-level circulation with decreasing vertical wind shear and a surge in the easterlies north of the disturbance.
- 190000Z - First warning issued due to the low-level circulation center moving under the edge of the central cloud mass, a developing upper-level anticyclone, and a current intensity estimate of CI 2.0.
- 220000Z - Upgraded to a tropical storm after convective curvature increased, upper-level outflow improved, and the first intensity estimate of CI 2.5.
- 240600Z - Upgraded to typhoon intensity after formation of an eye wall and intensity estimates of CI 4.0.
- 260600Z - Upgrade to a super typhoon followed the development of a well defined 40 nm (75 km) diameter eye and intensity estimates of CI 6.5.
- 271800Z - Downgraded to a typhoon after a decrease in central convection, visible loss of eye wall definition and an intensity estimate of CI 6.0.
- 300600Z - Downgrade to tropical storm based on increased vertical wind shear and the start of extratropical transition.
- 301200Z - Final warning based on a combination of land interaction with Honshu and extratropical transition.

III. TRACK AND MOTION

Page formed in the Marshall Islands near Kwajalein Atoll and tracked slowly westward on the south side of the subtropical ridge. As the disturbance passed south of Guam on 19 November, it interacted with enhanced low-level equatorial westerlies supporting a multiple cyclone outbreak further eastward near the date line (Figure 3-29-1). Page executed a counterclockwise loop which took two days to complete and then resumed a westward track on 22 November. As Page neared 125° east longitude, it tracked northward through a break in the subtropical ridge, recurved on 27 November, and accelerated northeastward.

IV. INTENSITY

Page's swirl of low-level cloudiness remained intact, but poorly organized, for two weeks beneath strong easterly flow aloft which restricted vertical development (Figure 3-29-2). On 23 November, the tropical cyclone began steady intensification in an area of lower vertical wind shear. Over the next three days, Page (Figure 3-29-3) underwent several periods of rapid intensification to reach a peak of 140 kt (72 m/sec) on 26 November. During this 72-hour period, the estimated sea-level pressure (Atkinson-Holliday, 1977) dropped 93 mb to a minimum of 898 mb with a subsequent 95 kt (50 m/sec) increase in the maximum winds. After maintaining peak intensity for a day, Page began to weaken due to increasing vertical wind shear as it encountered the mid-latitude westerlies. Extratropical transition occurred over Honshu on 30 November.

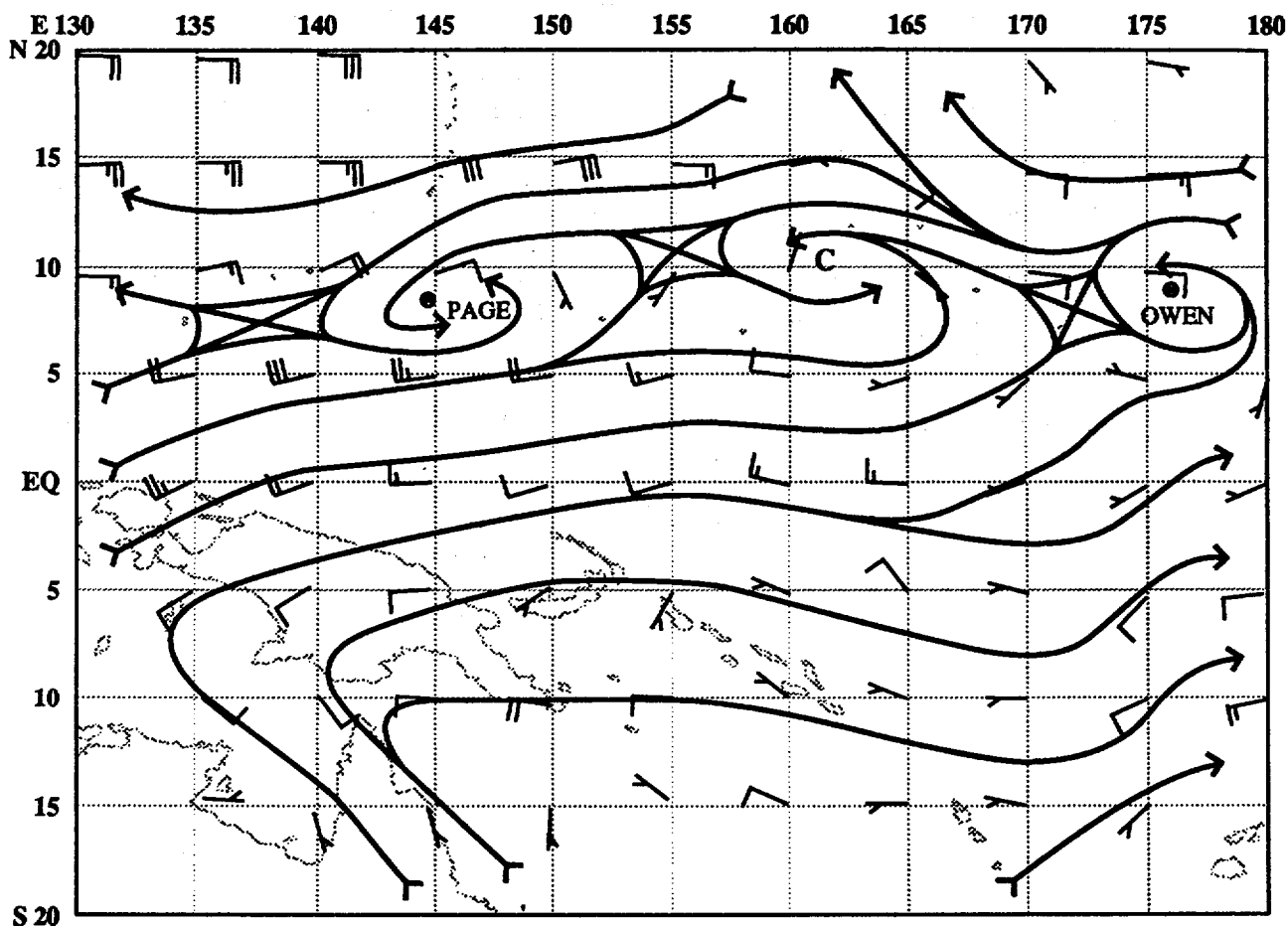


Figure 3-29-1. The 190000Z November NOGAPS 850-mb analysis shows enhanced low-latitude flow, extending eastward to the dateline where Owen (30W) was developing.

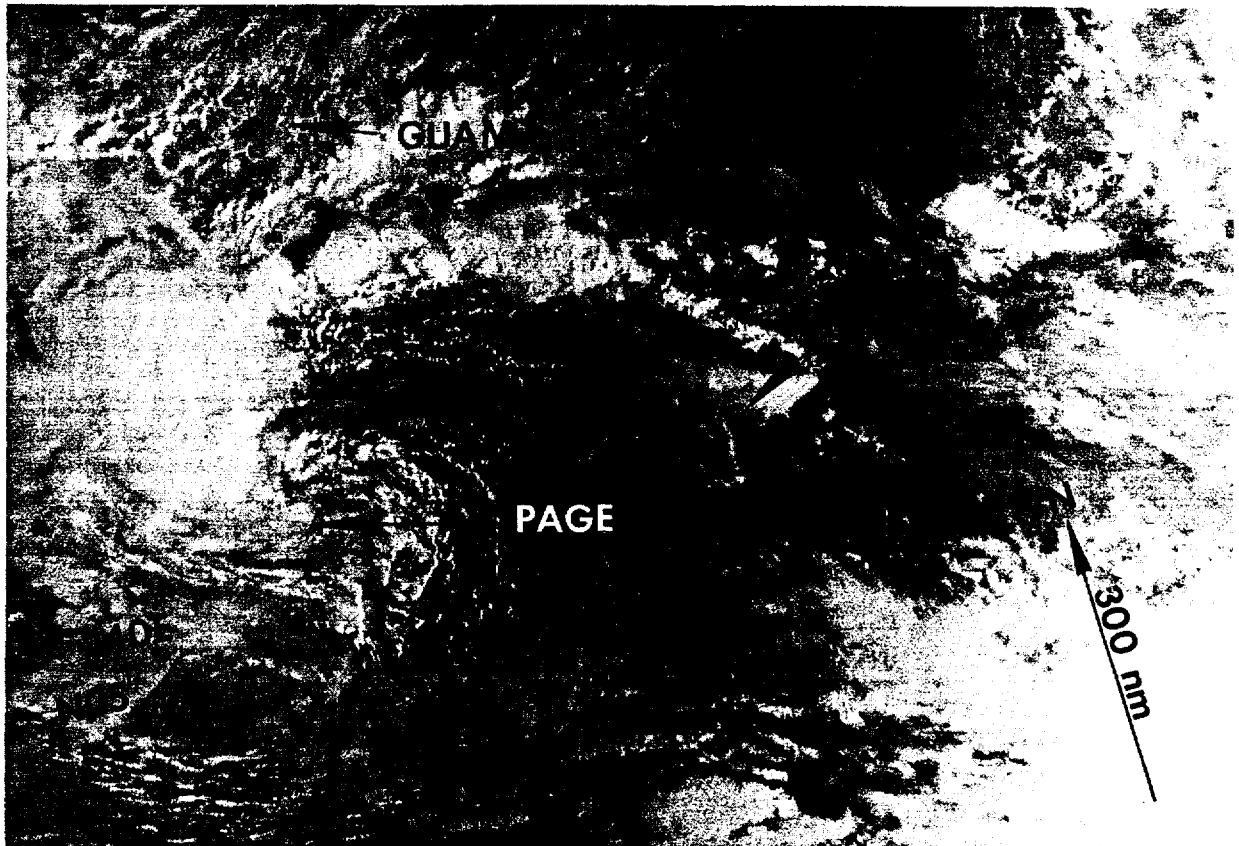


Figure 3-29-2. The exposed low-level circulation center associated with TD 29W as it loops south of Guam (202124Z November NOAA visual imagery).

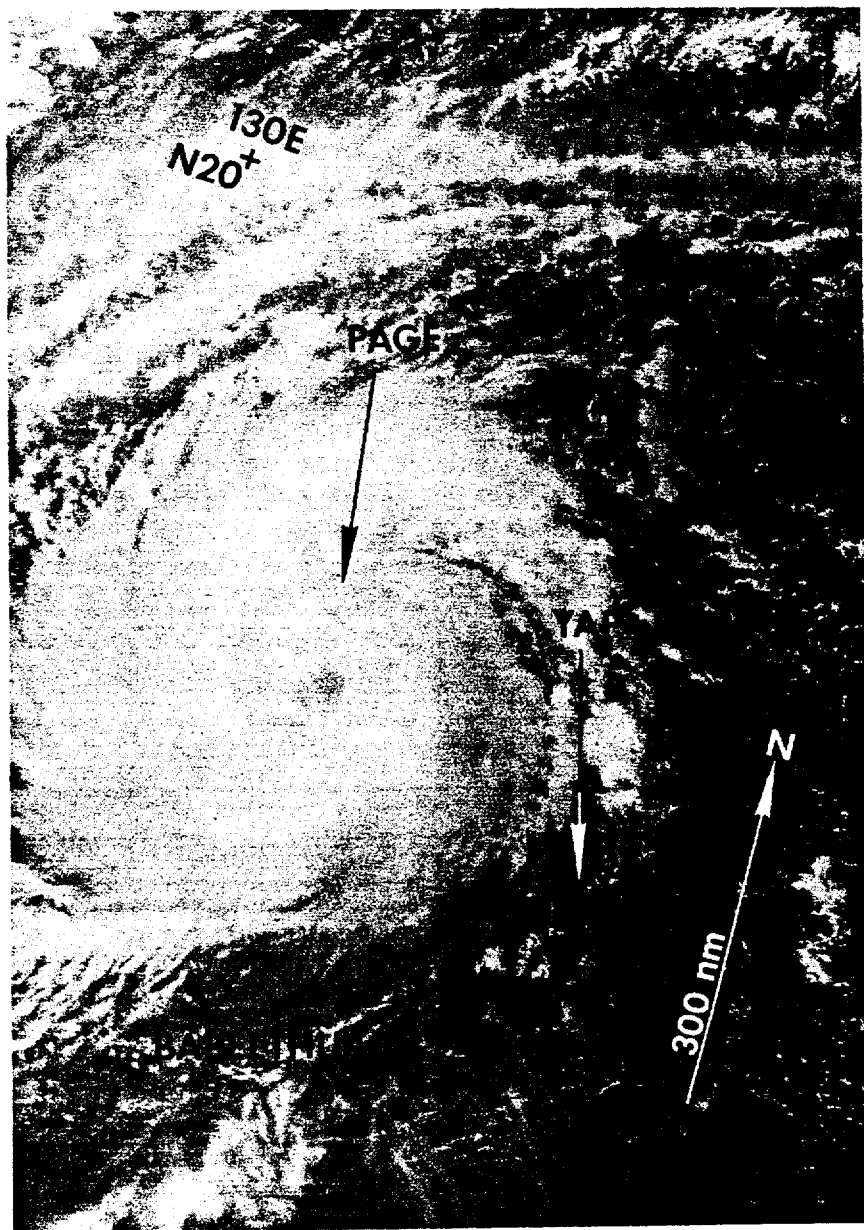


Figure 3-29-3. Super Typhoon Page near its peak intensity (250443Z November NOAA visual imagery).

V. FORECASTING PERFORMANCE

Overall JTWC forecast performance is shown in Figure 3-29-4. The difficulties came from two sources: first the loop south of Guam was unexpected, and second the NOGAPS prognostic series maintained a weak mid-level ridge over the Philippine Sea to the north of Page, supporting a west-northwestward track into the northern Philippines. At 250000Z, a moderate probability alternate scenario was formulated calling for Page to recurve east of the Philippines in response to a developing weakness in the subtropical ridge associated with a passing shortwave trough. This alternate became the primary forecast at 260000Z, as the ridge broke and recurvature followed.

VI. IMPACT

Guam received peak gusts to 46 kt (23 m/sec) at the International Airport (WMO 91212) on 23 November and over 5 inches (125 mm) of rain, which resulted in some localized flooding. No information was received about Page's passage over Honshu.

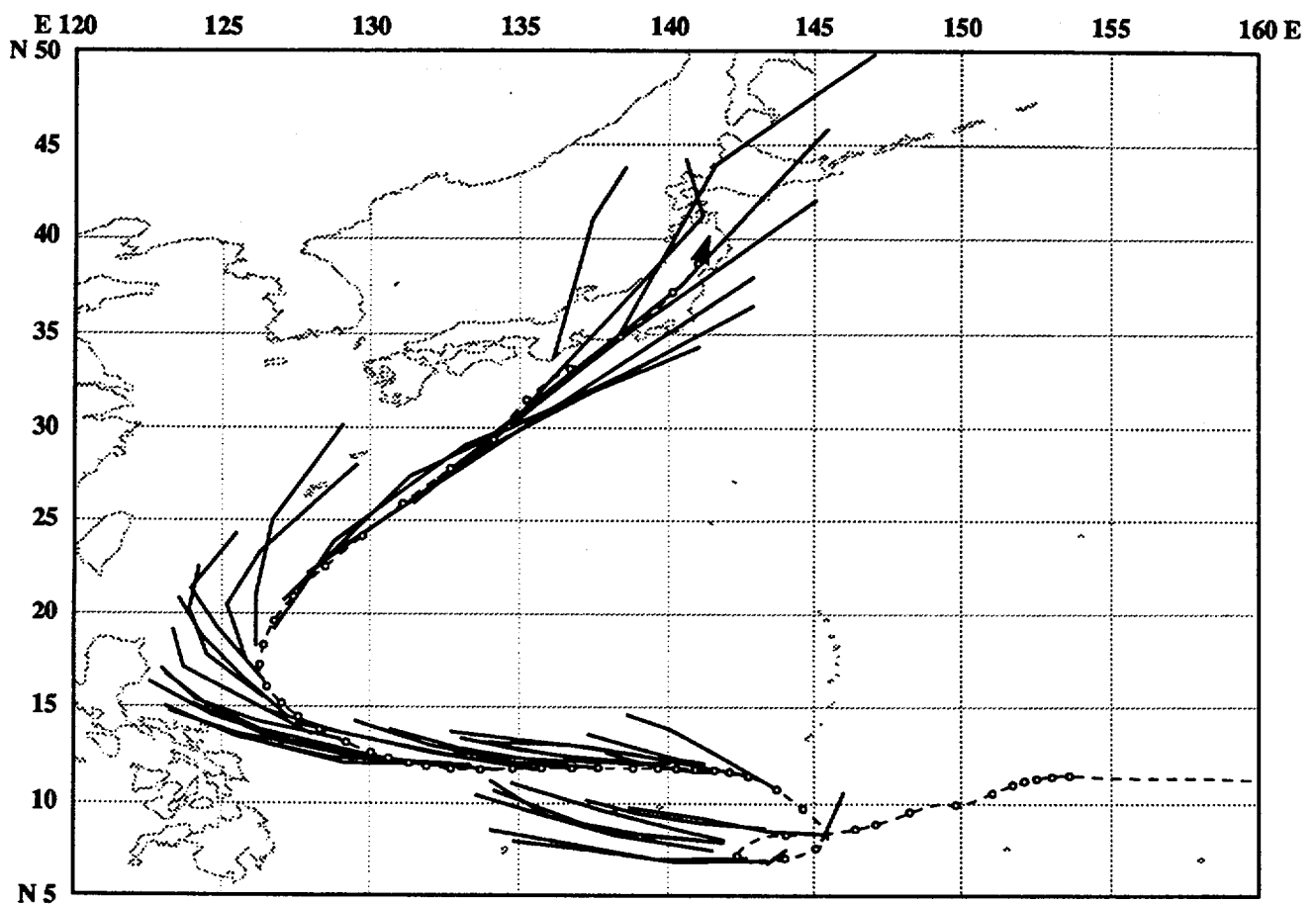


Figure 3-29-4. Summary of JTWC forecasts (solid lines) for Page superimposed on the final best track (dashed line).